PATENT
Attorney Docket No.: AHA-02101

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:	Group Art Unit: 2621
Eric John Hewitt et al.	Examiner:
Serial No.: 09/808,884	TRANSMITTAL LETTER
Filed: 03/14/01	260 Sheridan Avenue, Suite 420 Palo Alto, California 94306 (650)833-0160
For: ENHANCED TURBO PRODUCT CODES	

Assistant Commissioner for Patents
Washington, D.C. 20231

Sir:

Enclosed please find an Information Disclosure Statement and Form PTO-1449, including copies of the references contained thereon, for filing in the U.S. Patent and Trademark Office.

The Commissioner is hereby authorized to charge any additional fee or credit overpayment to our Deposit Account No. 08-1275. **An originally executed duplicate of this transmittal is enclosed for this purpose.**

Respectfully submitted,
HAVERSTOCK & OWENS LLP

Dated: 6-19-01

By: Thomas B. Haverstock
Thomas B. Haverstock
Reg. No.: 32,571
Attorneys for Applicants

CERTIFICATE OF MAILING (37 CFR § 1.8(a))

I hereby certify that this paper (along with any referred to as being attached or enclosed) is being deposited with the U.S. Postal Service on the date shown below with sufficient postage as first class mail in an envelope addressed to the: Assistant Commissioner for Patents, Washington, D.C. 20231.

HAVERSTOCK & OWENS LLP,

Dated: 6-20-01 By: C. L. Gray

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Sir:

The citations listed below, copies attached, may be material to the examination of the above-identified application, and are therefore submitted in compliance with the duty of disclosure defined in 37 C.F.R. " 1.56 and 1.97. The Examiner is requested to make these citations of official record in this application.

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Applicants have become aware of the following printed publications which may be material to the examination of this application:

- U. S. Patent 4,845,714;
- U.S. Patent 5,406,570;
- U.S. Patent 5,446,747;
- U.S. Patent 5,499,254;
- U.S. Patent 5,563,897;
- U.S. Patent 5,566,191;
- U.S. Patent 5,684,811;
- U.S. Patent 5,703,911;
- U.S. Patent 5,719,884;
- U.S. Patent 5,721,745;
- U.S. Patent 5,721,746;
- U.S. Patent 5,729,560;
- U.S. Patent 5,761,248;
- U.S. Patent 5,787,127;
- U.S. Patent 5,787,239;
- U.S. Patent 5,802,116;
- U.S. Patent 5,841,818;
- U.S. Patent 5,901,182;
- U.S. Patent 5,907,582;
- U.S. Patent 5,930,272;
- U.S. Patent 6,145,111;

- European Patent 0 625 829 A2;

- R. Pyndiah et al., "Performance of Block Turbo Coded 16-QAM and 64-QAM Modulations," IEEE, 1995, pp. 1039-1043;

- A. Picart & R. Pyndiah, "Performance of Turbo-Decoded Product Codes Used in Multilevel Coding," IEEE, 1996, pp. 107-111;

- R. Pyndiah, "Near-Optimum Decoding of Product Codes: Block Turbo Codes," IEEE Transactions on Communications, Vol. 46, No. 8, Aug. 1998, pp. 1003-1010;

- J. Cheng & R. McEliece, "Frequency-Efficient Coding with Low-Density Generator Matrices," Aug. 1997 draft, (presented in part: Oct. 1996 at 34th Allerton Conference on Communications, Control, and Computing, Monticello, Illinois; and 1997 IEEE International Symposium on Information Theory, Ulm, Germany, July 1997), pp. 1-30;

- S. Dolinar et al.,"Code Performance as a Function of Block Size," TMO Progress Report 42-133, May 1998, pp. 1-23;

- D. Divsalar & F. Pollara, "Multiple Turbo Codes for Deep-Space Communications," TDA Progress Report 42-121, May 1995, pp. 66-77;

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- D. Divsalar & F. Pollara, "On the Design of Turbo Codes," TDA Progress Report 42-123, Nov. 1995, pp. 99-121;

- G. Battail et al.,"Pseudo-Random Recursive Convolutional Coding For Near-Capacity Performance," IEEE, 1993, pp. 23-27;

- M. Moher, "Decoding Via Cross-Entropy Minimization," IEEE, 1993, pp. 809-813;

- S. Benedetto et al.,"Soft-Output Decoding Algorithms for Continuous Decoding of Parallel Concatenated Convolutional Codes," IEEE, 1996, pp. 112-117;

- P. Hoeher, "Advances in Soft-Output Decoding," IEEE, 1993, pp. 793-797;

- C. Berrou et al., "A Low Complexity Soft-Output Viterbi Decoder Architecture," IEEE, 1993, pp. 737-740;

- J. Hagenauer, "Decoding of Binary Codes with Analog Networks," ITW, Feb. 1998, pp. 13-14;

- N. Seshadri & P. Hoeher, "On Post-Decision Symbol-Reliability Generation," IEEE, 1993, pp. 741-745;

- D. Costello Jr. & H. Cabral, "The Effect of Turbo Codes on Figure 1," ITW, Feb. 1998, pp. 41-42;

- D. Divsalar & F. Pollara , "Turbo Codes for PCS Applications," (no date or publisher listed);

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- A. J. Viterbi et al.,"Perspectives on Interleaved Concatenated Codes with Iterative Soft-Output;
- Decoding," International Symposium on Turbo Codes, 1997, pp. 47-54;

- C. Wang, "Asymptotic Performances of Nonrepetitive & Repetitive Turbo Codes," IEEE, 1997, pp. 1-6;

- A. Hunt and S. Crozier, "Hyper-Codes: High-Performance Low-Complexity Error-Correcting Codes," (no date or publisher listed);

- C. Wang, "On the Performance of Turbo Codes," IEEE, 1998, pp. 987-992;

- S. Benedetto et al, "Analysis, Design, and Iterative Decoding of Double Serially Concatenated Codes with Interleavers," IEEE Journal on Selected Areas in Communications, Vol. 16, No. 2, Feb. 1998, pp. 231-244;

- O. Acikel & W. Ryan, "Punctured Turbo Codes for BPSK/QPSK Channels," (no publisher listed), Mar. 1999, pp. 1-30;

- O. Acikel, "Implementation Issues for High Rate Turbo Codes on BPSK/QPSK Channels," (no publisher listed), Mar. 1999, pp. 1-12;

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- L. Bahl et al., "Optimal Decoding of Linear Codes for Minimizing Symbol Error Rate," IEEE Transactions on Information Theory, Jan. 1972, pp. 284-287, International Symposium on Information Theory, Asilomar, CA;

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- D. Chase, "A Class of Algorithms for Decoding Block Codes with Channel Measurement Information," IEEE Transactions on Information Theory Jan. 1972, pp. 170- 181;
- P. Adde et al., "Design and performance of a product code turbo encoding-decoding prototype," pp. 214-219. Ann Telecommun., Vol. S4, No. 3-4, 1999;
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- L. Tolhuizen & C.P.M.G. Baggen, "On the weight enumerator of product codes," Discrete Mathematics, 1992, Vol. 106, No. 107 pp. 483-88;
- F. Chiaraluce & R. Garello, "On the Asymptotic Performance of Hamming Product Codes", ISCTA 01, pp. 1-6, July 15, 2001;
- H. Nickl,et al., "Approaching Shannon's capacity limit by 0.27 dB using Hamming codes in a 'turbo'- decoding scheme," ISIT 1997;

- J. Lodge et al., "Separable Map "Filters" For The Decoding Of Product and Concatenated Codes," IEEE, 1993, pp. 1740-1745;

- J. Hagenauer & P. Hoeher, " A Viterbi Algorithm with Soft-Decision Outputs and its Applications," IEEE, 1989, pp. 1680-1686;

- S. Hirasawa et al., "Modified Product Codes," IEEE 1984, Vol. 1T-30, No. 2, pp. 299-306;

- G. Ungerboeck, "Channel Coding with Multilevel/ Phase Signals," IEEE Transactions on Information Theory Vol. IT-28, No. 1, Jan. 1982;

- S. Cambanis & M. Habib, "Finite Sampling Approximations for non-Band-Limited Signals," IEEE, Vol. 25, No. 5, July, 1981, p. 67;

- U. Wachsmann et al., "Multilevel Codes: Theoretical Concepts and Practical Design Rules," IEEE, Vol. 25, No. 5, July 1999, pp. 1361-1391;

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- O. Acikel & W. Ryan, "High Rate Turbo Codes for BPSK/QPSK Channels," IEEE, 1998, pp. 422- 427;

- W. Blackert & S. Wilson, "Turbo Trellis Coded Modulation," University of Virginia[undated][no page numbers];

- J. Hagenauer, P. Hoeher, " Algorithm with Soft-Decision Outputs and its Applications," IEEE 1989 pp. 1680-1686; and

- C. Berrou, "Near Optimum Error Correcting Coding and Decoding: Turbo-Codes," IEEE, Vol. 44, No. 10, Oct. 1996, pp. 1261-1271;

This Information Disclosure Statement under 37 C.F.R. " 1.56 and 1.97 is not to be construed as a representation that a search has been made, that additional information material to the examination of this application does not exist, or that anyone or more of these citations constitutes prior art.

Respectfully submitted,
HAVERSTOCK & OWENS LLP

Dated: 6-19-01

By: Thomas B. Haverstock
Thomas B. Haverstock
Reg. No.: 32,571

Attorneys for Applicants

FORM PTO-1449 (Modified)

U.S. Department of Commerce Patent and Trademark Office

SUPPLEMENTAL INFORMATION DISCLOSURE STATEMENT BY APPLICANT
(Use Several Sheets If Necessary)

(37 CFR § 1.98(b))

Attorney Docket No.: AHA-02101	Serial No.: 09/808,884
Applicant: Eric John Hewitt et al.	
Filing Date: March 14, 2001	Group Art Unit: 2600

U.S. PATENT DOCUMENTS

Examiner Initials		Serial / Patent Number	Issue Date	Applicant / Patentee	Class	Subclass	Filing Date
	AA	4,845,714	7/04/89	Zook	371	50	6/08/87
	AB	5,406,570	4/11/95	Berrou et al.	371	43	4/16/92
	AC	5,446,747	8/29/95	Berrou	371	45	4/16/92
	AD	5,499,254	3/12/96	Ikekawa et al.	371	43	8/31/94
	AE	5,563,897	10/08/96	Pyndiah et al.	371	37.4	11/18/94
	AT	5,566,191	10/15/96	Ohnishi et al.	371	43	5/07/93
	AF	5,684,811	11/04/97	Doran	371	43	9/01/95
	AG	5,703,911	12/30/97	Lin et al.	375	341	8/17/95
	AH	5,719,884	2/17/98	Roth et al.	371	37.4	7/27/95
	AI	5,721,745	2/24/98	Hladik et al.	371	43	4/19/96
	AJ	5,721,746	2/24/98	Hladik et al.	371	43	4/19/96
	AK	5,729,560	3/17/98	Hagenauer et al.	371	43.1	6/12/96
	AL	5,761,248	6/02/98	Hagenauer et al.	375	340	7/19/96
	AM	5,787,127	7/28/98	Ono et al.	375	341	7/22/96
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	AR	5,907,582	5/25/99	Yi	375	259	8/11/97
	AS	5,930,272	7/27/99	Thesling	371	37.01	6/10/97
	AT	6,145,111	11/07/00	Crozier et al.	714	755	8/14/98
	AU						

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		Document Number	Publication Date	Country / Patent Office	Class	Subclass	Translation Yes	Translation No
	AA	0 625 829 A2	11/23/94	EP	H03M	13/00		X
	AB							

OTHER DOCUMENTS (Including Author, Title, Date, Relevant Pages, Place of Publication)

	AA	R. Pyndiah et al., "Performance of Block Turbo Coded 16-QAM and 64-QAM Modulations," IEEE, 1995, pp. 1039-1043.
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	AF	D. Divsalar & F. Pollara, "Multiple Turbo Codes for Deep-Space Communications," TDA Progress Report 42-121, May 1995, pp. 66-77.
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	AN	J. Hagenauer, "Decoding of Binary Codes with Analog Networks," ITW, Feb. 1998, pp. 13-14.
	AO	N. Seshadri & P. Hoeher, "On Post-Decision Symbol-Reliability Generation," IEEE, 1993, pp. 741-745.
	AP	D. Costello Jr. & H. Cabral, "The Effect of Turbo Codes on Figure 1," ITW, Feb. 1998, pp. 41-42.
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	AR	C. Berrou et al., "An IC for Turbo-Codes Encoding and Decoding," IEEE, 1995, pp. 90-91.
	AS	A. J. Viterbi et al.,"Perspectives on Interleaved Concatenated Codes with Iterative Soft-Output Decoding," International Symposium on Turbo Codes, 1997, pp. 47-54.
	AT	C. Wang, "Asymptotic Performances of Nonrepetitive & Repetitive Turbo Codes," IEEE, 1997, pp. 1-6.
	AU	A. Hunt and S. Crozier, "Hyper-Codes: High-Performance Low-Complexity Error-Correcting Codes," (no date or publisher listed).
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	BE	P. Adde et al., "Design and performance of a product code turbo encoding-decoding prototype," pp. 214-219. Ann Telecommun., Vol. S4, No. 3-4, 1999.
	BF	A. Goalic et al., "Real-Time Turbo-Decoding of Product Codes on a Digital Signal Processor," 3/11/97, pp. 624-628.

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	BQ	G. Caire et al., "Bit- Interleaved Coded Modulation," IEEE, Vol. 44, No. 3 May 1998, pp. 927- 945.
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